works. It is a cantilever, low-wing, cabin monoplane to seat two. The wings are wholly of wooden construction with ply and fabric covering; a welded steel tubular structure is, however, used for the fuselage, which is also fabric covered. An air-cooled, inverted, four-cylinder engine built under licence from Hirth is the power unit, and with an output of 100 h.p., the speeds are 125 m.p.h. for cruising and 145 m.p.h. maximum. Other dimensions include span and length of 29ft. 6in. and 23ft. 7in. respectively, weight empty 981 lb., and total weight 1,543 lb. The landing speed with flaps is 46.5 m.p.h. and the normal range 465 miles.

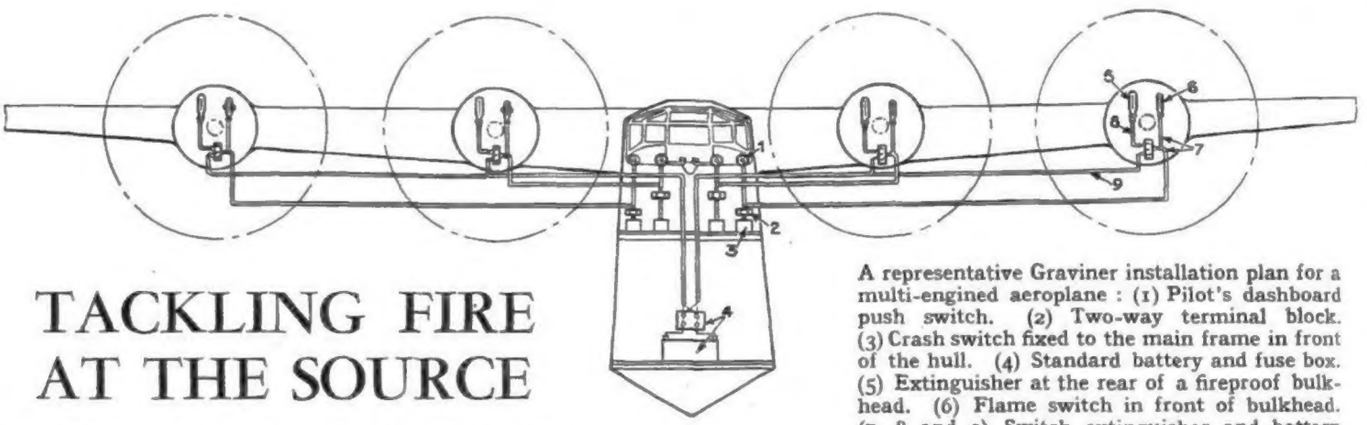
Three trainers built by Tatra were also to be seen, and these included the T.131 two-seater biplane built under Bücker licence and the 350 h.p. T.126 built under Avro licence.

A quartet of wooden, low-wing, cantilever monoplanes were displayed by Benes and Mraz. The Beta Minor Be.50 and 51 are two-seaters with Walter Minor engine, and differ only in having an open cockpit in the case of the 50 and a closed one for the 51. Seen at the Brussels Exhibition, the Be.550, or Bibi, has a 50 h.p. Walter Mikron engine. Largest of the four, the Be.56 has an 120/130 h.p. Walter Major-4 engine, and is a single-seater specially stressed for aerobatics. The machine has a maximum speed of 150 m.p.h.

Only one aircraft represented the commercial side at Prague, the Aero A.204. With retractable undercarriage, this modern eight-passenger, metal monoplane, which also carries a crew of three, is said to be capable of 200 m.p.h. with two Walter Super-Castor engines. The weight loaded is 9,480 lb., the span is 62.3ft. and the length 42.6ft.

One or two outstanding exhibits were displayed in the military section. The Avia 35 single-seater fighter is an all-metal, low-wing, cantilever monoplane with retractable undercarriage and 1,000 h.p. engine. A speed of 310 m.p.h. is claimed. A 600 h.p. Rolls-Royce Kestrel VI powers the Praga E.45 single-seater fighter biplane, and a similar machine, the Avia 34, has a 650 Hispano-Suiza engine. The Aero MB200 bomber is built under licence from Marcel Bloch.

Among the engine exhibits could be seen Bristol Mercury and Pegasus, and a new Walter Mikron II with an output of 60-62 h.p. at 2,600-2,800 r.p.m. The bore of this unit has been increased by 3 mm. to 88 mm., and the compression ratio from 5.2 to 6.1 to 1. This modified Mikron now weighs 134.5 lb. A new direct-drive Praga D flat four is of 2.8 litres capacity and gives 80 h.p. at 2,520 r.p.m. This rating is a maximum continuous power for thirty minutes. A geared version of the Praga D with increased compression has a maximum output of 90 h.p. at 3,000 r.p.m. The firm are now producing an inverted, air-cooled six-cylinder engine of 10.3 litres capacity from which a normal output of 220 h.p. and a maximum of 300 h.p. is obtained. The weight is 485 lb.

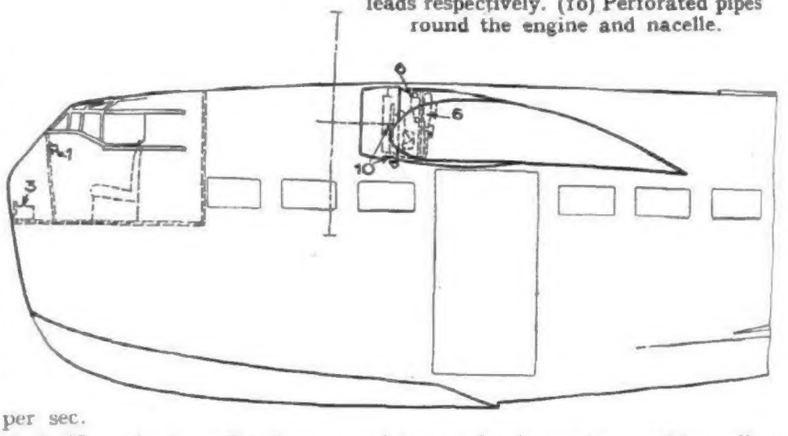


A representative Graviner installation plan for a multi-engined aeroplane: (1) Pilot's dashboard push switch. (2) Two-way terminal block. (3) Crash switch fixed to the main frame in front of the hull. (4) Standard battery and fuse box. (5) Extinguisher at the rear of a fireproof bulkhead. (6) Flame switch in front of bulkhead. (7, 8 and 9) Switch, extinguisher and battery leads respectively. (10) Perforated pipes round the engine and nacelle.

TACKLING FIRE AT THE SOURCE

FOR many years past the Air Ministry has been testing various forms of fire extinguishing installations for aircraft use. It is interesting to enumerate and examine the qualities demanded, especially in view of the fact that it is now possible to describe certain equipment, produced by the Graviner Manufacturing Co. (of First Avenue House, High Holborn, London, W.C.1), to comply with these requirements. The first is that the total weight must not exceed 12 lb. The weight of the complete Graviner extinguisher is less than 12 lb., including 6½ lb. of methyl bromide, said to be the most effective extinguishing medium known for the type of fire. (2) The extinguisher must work automatically and instantaneously in a crash, spraying the engine and interior of the cowling with the methyl bromide, discharge being completed in three to five seconds. The difficulty in this connection is to decide what constitutes crash conditions. An aircraft when it is decelerated at 5 to 6 g (g=32ft. per sec. per sec.) will suffer structural damage, but at 2 to 3 g no damage should occur. A bad landing or severe aerobatic manœuvres may produce accelerations near to crash conditions but must not operate the automatic valve. (3) The extinguisher must operate automatically when fire breaks out, because immediate action is required in case of fire in the air or on the ground. This is not too easy to arrange, as operational temperatures of engines and in the cowlings are quite high. (4) A hand-operated switch must be provided in the cockpit to effect operation at any time it may be required. (5) The extinguisher must be useful as a hand extinguisher when detached from its bracket. An additional fitting obtainable with the Graviner equipment, which satisfies all these demands, is a petrol cock which instantly shuts off petrol in the case of a crash.

Carbon dioxide is the more usual extinguishing medium in the United States, and, like carbon tetra-chloride, it depends upon the blanketing action of the gas. As a medium carbon dioxide is compressed in bottles, and the apparatus is inclined to be on the heavy side. Carbon tetra-chloride apparatus may also be rather heavy, and in certain circumstances this medium produces chlorine and even phosgene when sprayed on hot metal parts. Both these gases are poisonous. Methyl bromide has less toxic decomposition products than carbon tetra-chloride, and the weight of the Graviner apparatus has been kept under 12 lb. with 3½ pt. of this medium.



Methyl bromide is specified by the Air Ministry in this country. It is a liquid when under pressure which evaporates with intense lowering of temperature, when liberated.

In the Graviner apparatus the extinguisher proper is a three-pint copper bottle having a very simple patented form of discharge head with an electric fuse permitting complete discharge in a few seconds. Pipe lines from a junction box engaging the head lead the methyl bromide to various key points in the engine or engines and cowling. On operation jets of the medium are played on the hot parts and, due to the intense cooling effect, the temperature of the metal is reduced below the ignition temperature of the fuels, or if fire has already broken out the powerful inhibiting action of methyl bromide comes into play.